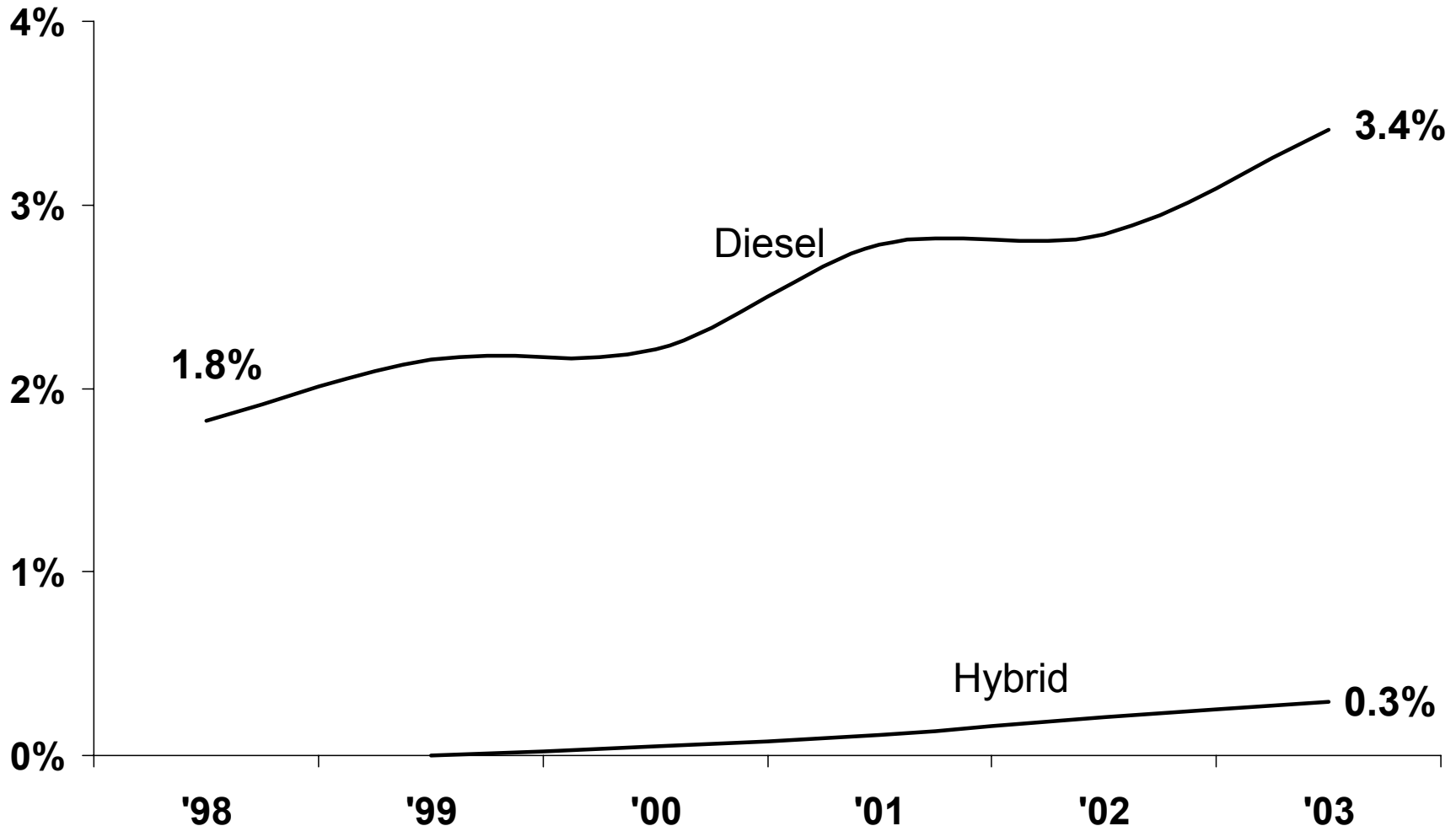


Prospects for Hybrids in the U.S. Market

Walter McManus, President
McManus Analytics LLC

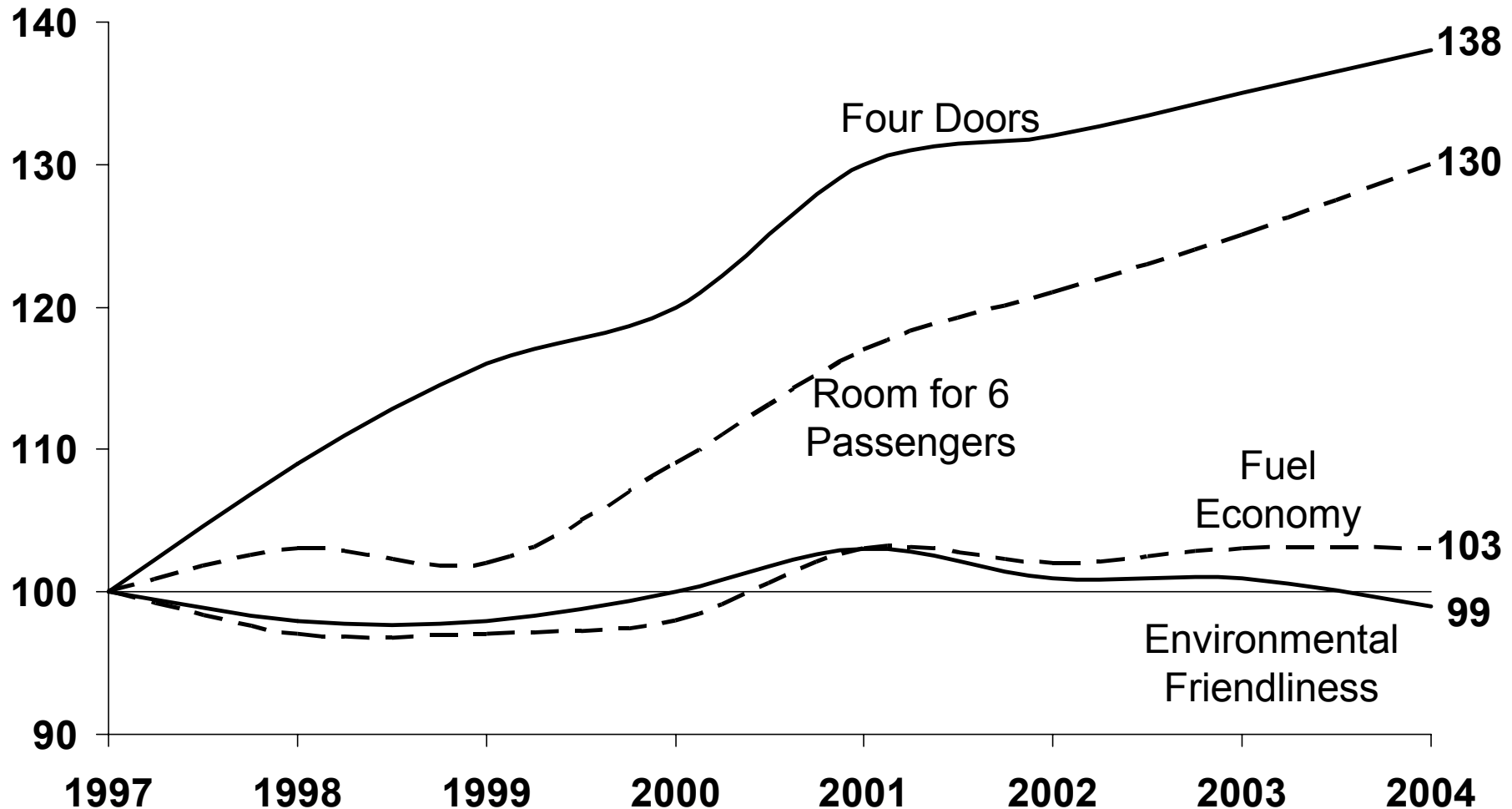
In the U.S., diesel and hybrid vehicles are increasing their shares of light vehicle sales.

Share of Light
Vehicle Sales



Trends in Importance Ratings by U.S. Consumers of Selected Attributes

Index Value (1997=100)



Source: J.D. Power and Associates, Automotive Performance, Execution, and Layout Study, 1997-2004 prelim

Simulation Model (Greene-Duleep-McManus)

- Derive or assume values of attributes such as fuel economy, range, fuel availability and torque in RPE-equivalent, as well as price elasticities
- Calibrate NMNL model to 2002 LDV data
- “Create” new nameplate/configurations for hybrids and diesels
- Estimate new market shares

What consumer attributes were explicitly included?

- Retail Price Equivalent
- Fuel Economy (3-yr payback)
- Range
- Torque
- Fuel Availability
- No diesel or hybrid “extra value”

Diesel prices are expected to increase with Tier II standards.

	Small Vehicle (2.0- 2.5L I4)	Midsize Vehicle (3.0- 3.5L V6)	Large Vehicle (4.5-5.0L V6)
2005	\$1,750	\$2,300	\$2,500
2008	\$2,280	\$2,925	\$3,200
2012	\$2,300	\$2,950	\$3,250

Hybrid incremental prices depend on vehicle size and type of system (2012 prices shown).

	Small Cars	Mid-Large Cars	Small Trucks	Large Trucks
Stop/Start	\$600	\$640	\$640	--
ISAD	\$1,250	\$1,385	\$1,450	\$1,625
IMA	\$1,620	\$1,790	--	--
Full Hybrid	\$3,320	\$3,920	\$3,700	\$4,100

Hybrids and diesels are expected to deliver both higher MPG and more torque.

- Hybrids

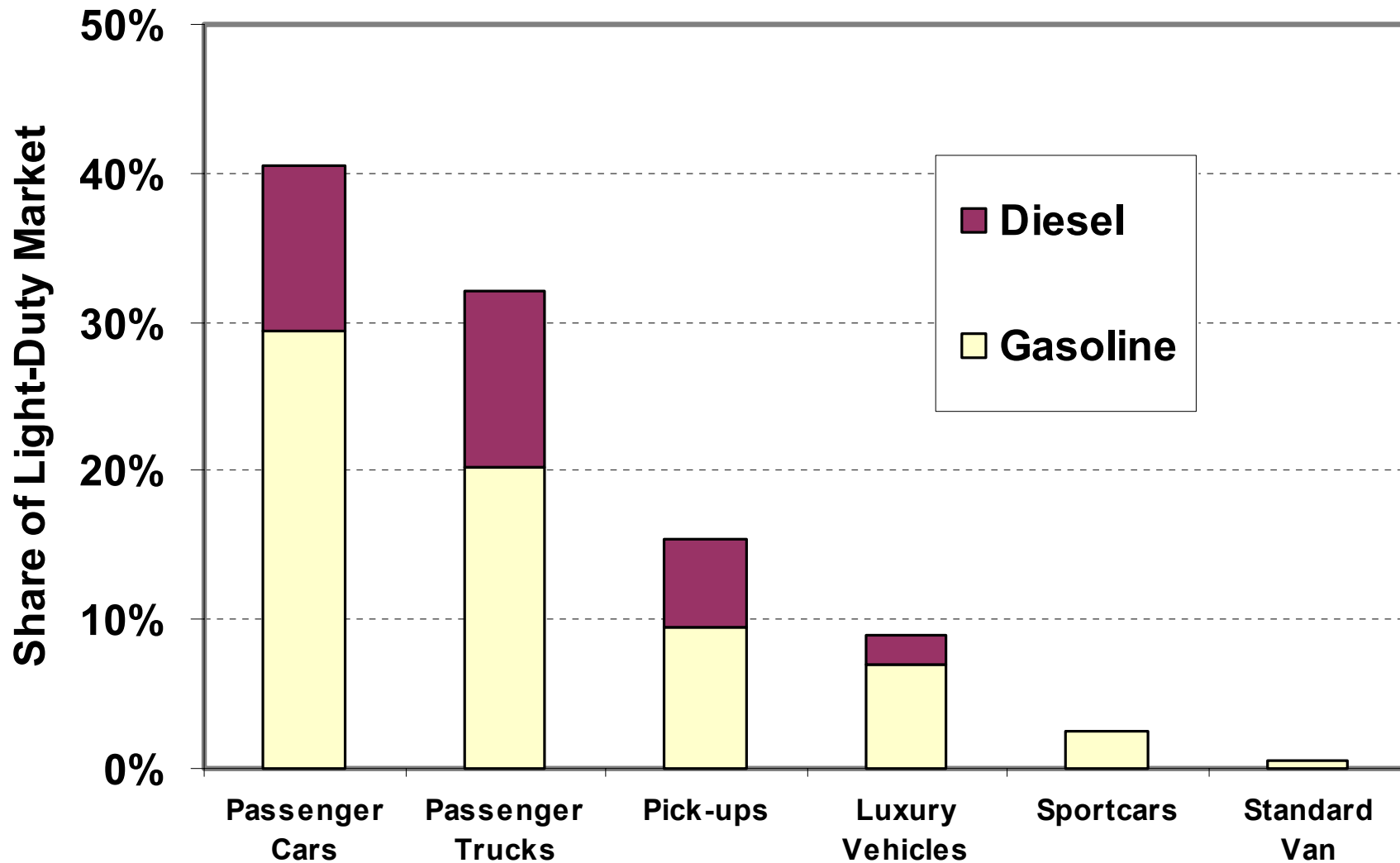
	Torque	MPG
S/S	0%	7.5%
ISAD	10%	12.5%
IMA	15%	20%
Full Lg. Trk.	15%	35%
Full Car & Sm. Trk.	20%	40%

- Diesels

	Torque	MPG
2005	25%	35%
2008	25%	30%
2012	25%	33%

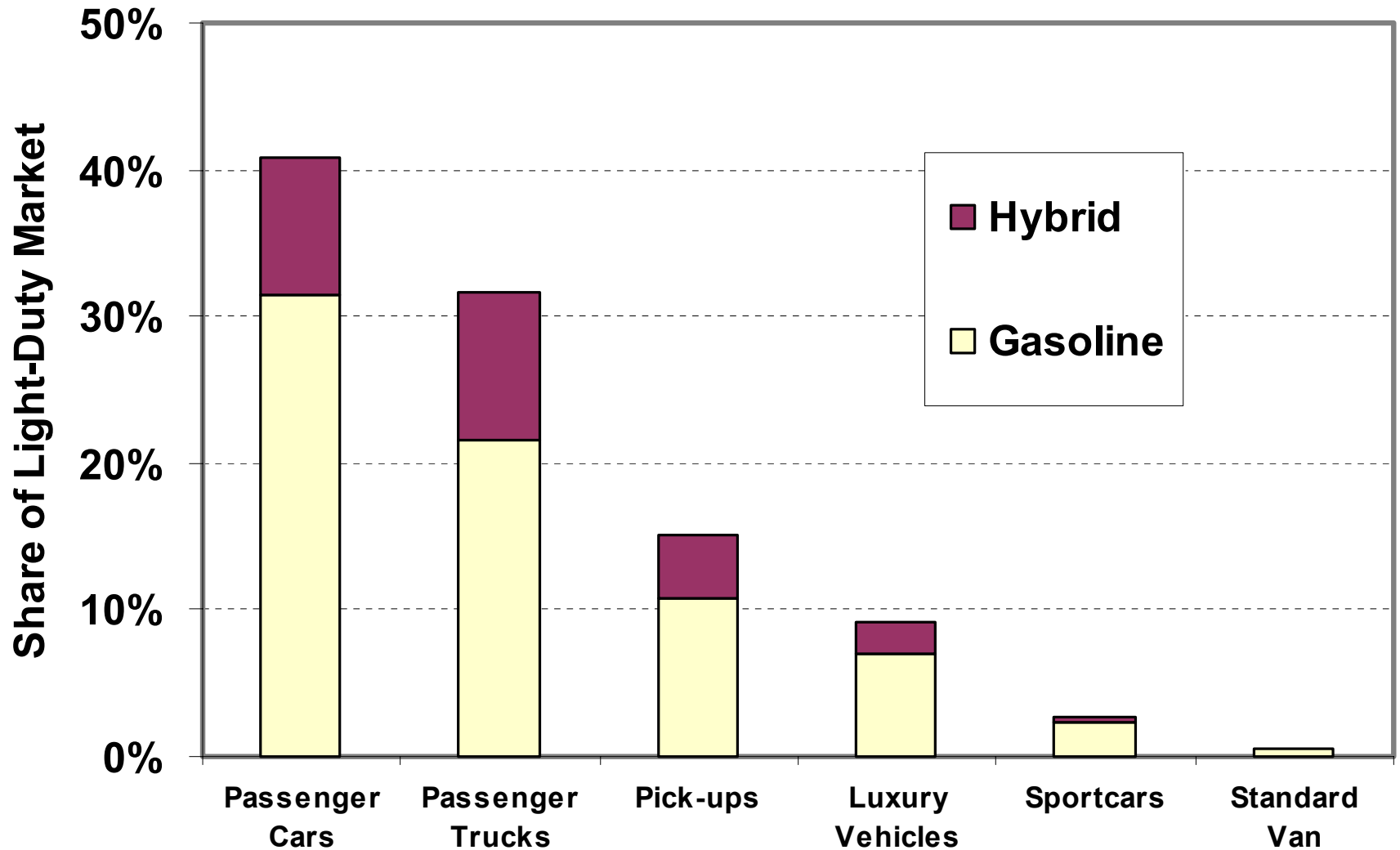
Technology Market Shares by Vehicle Type

>2012 Diesel Only Scenario



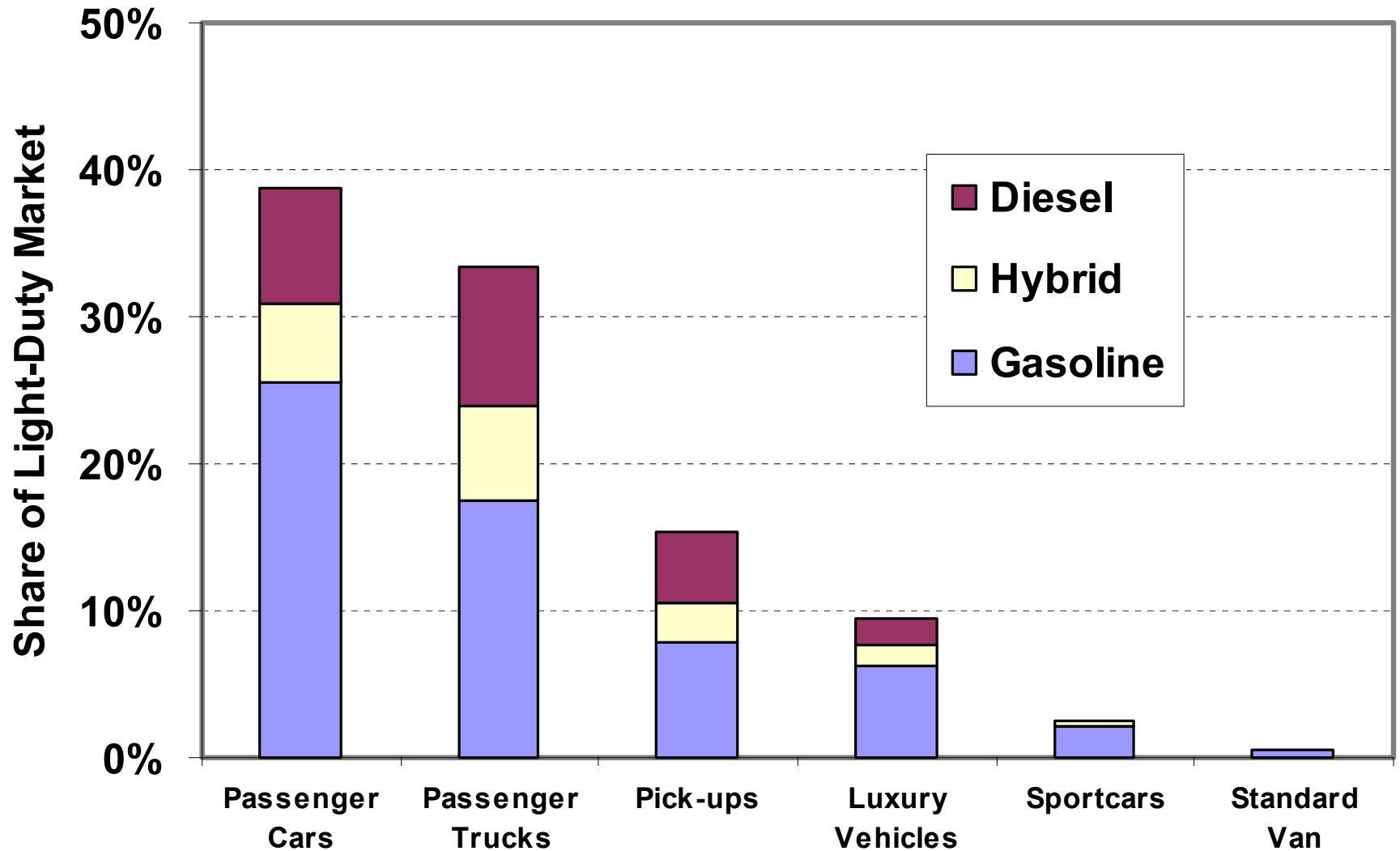
Technology Market Shares by Vehicle Type

>2012 Full Hybrid Scenario



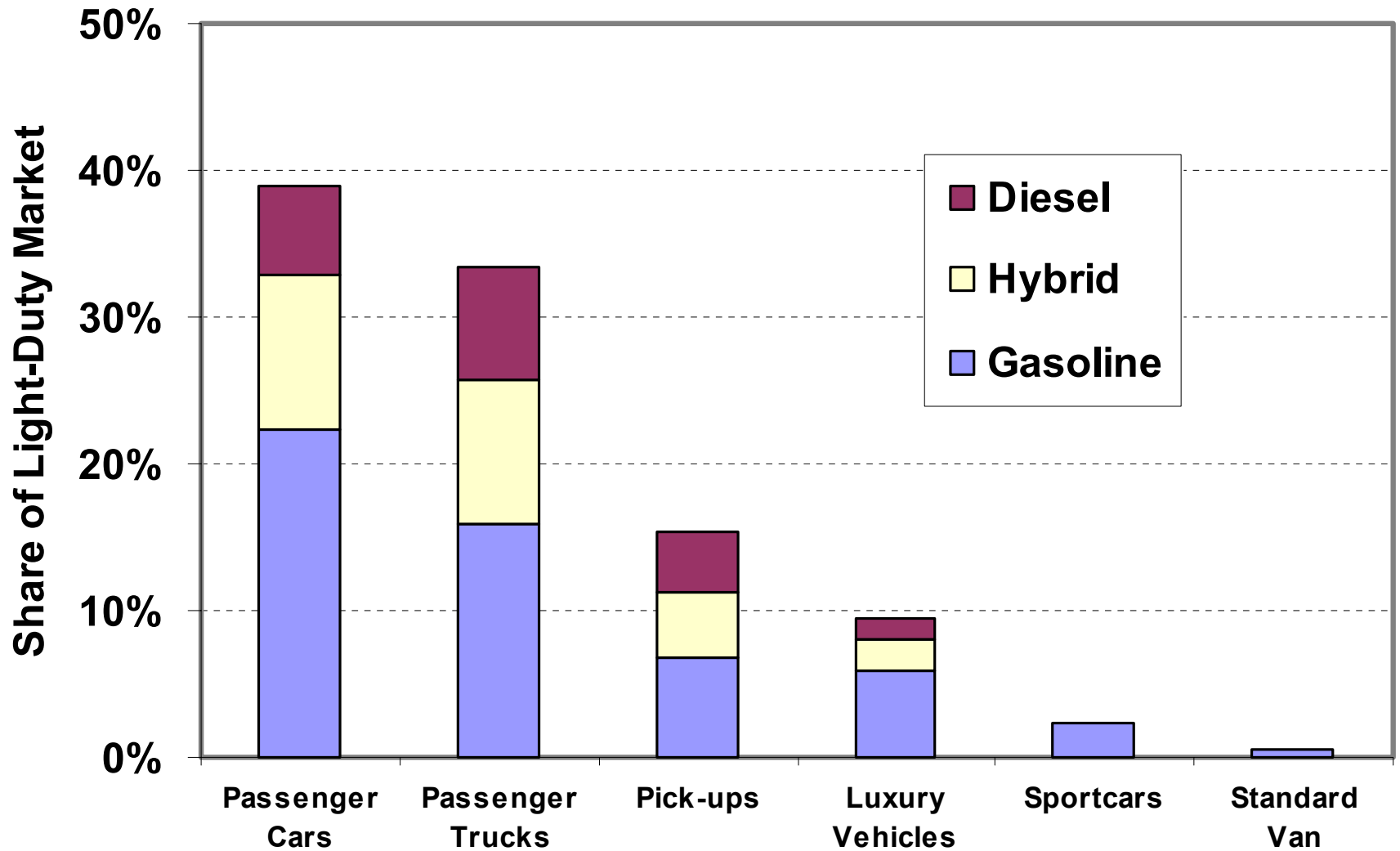
Technology Market Shares by Vehicle Type

>2012 Diesel & Full Hybrid Scenario



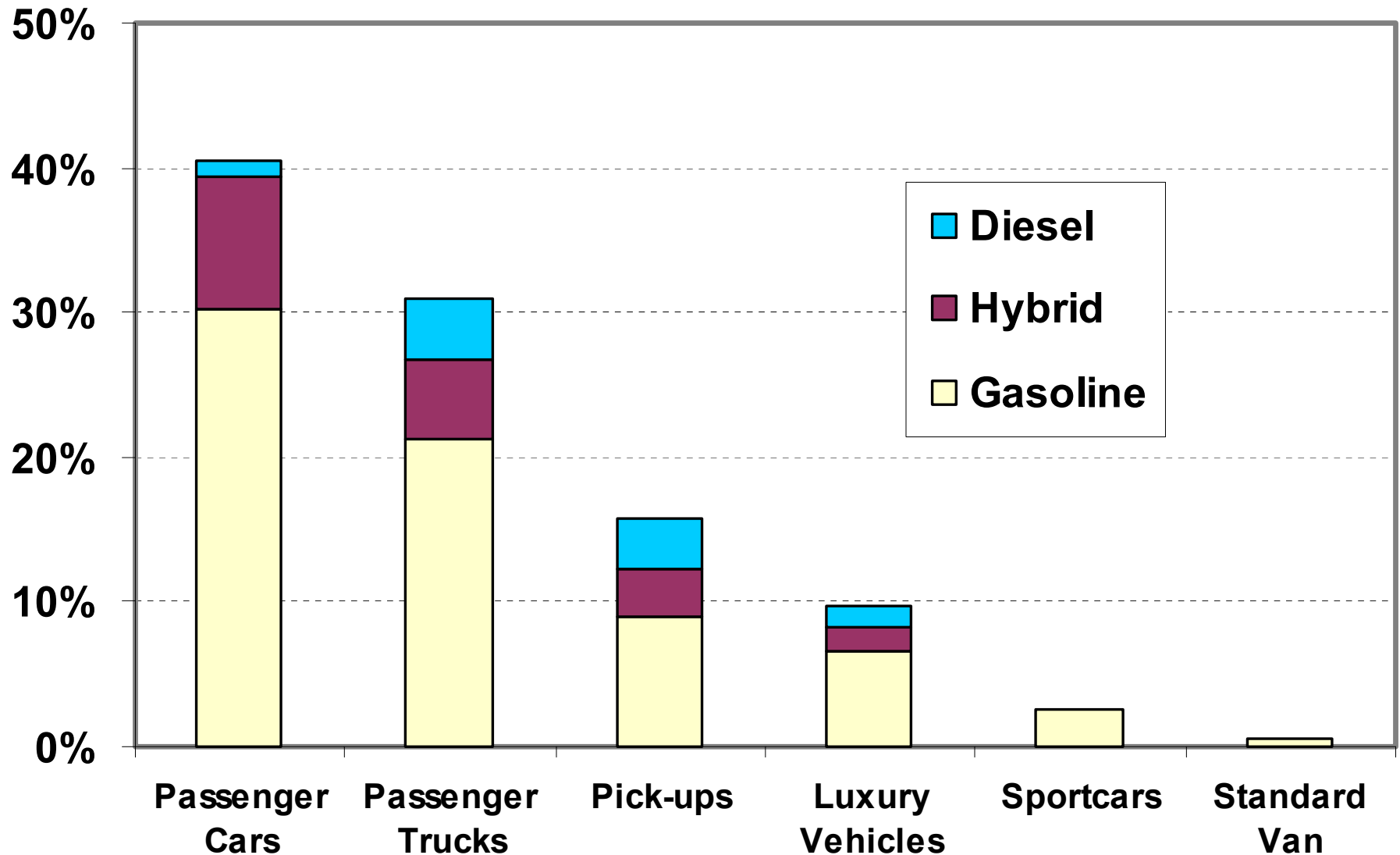
Technology Market Shares by Vehicle Type

>2012 Diesel & ISAD Hybrid Scenario

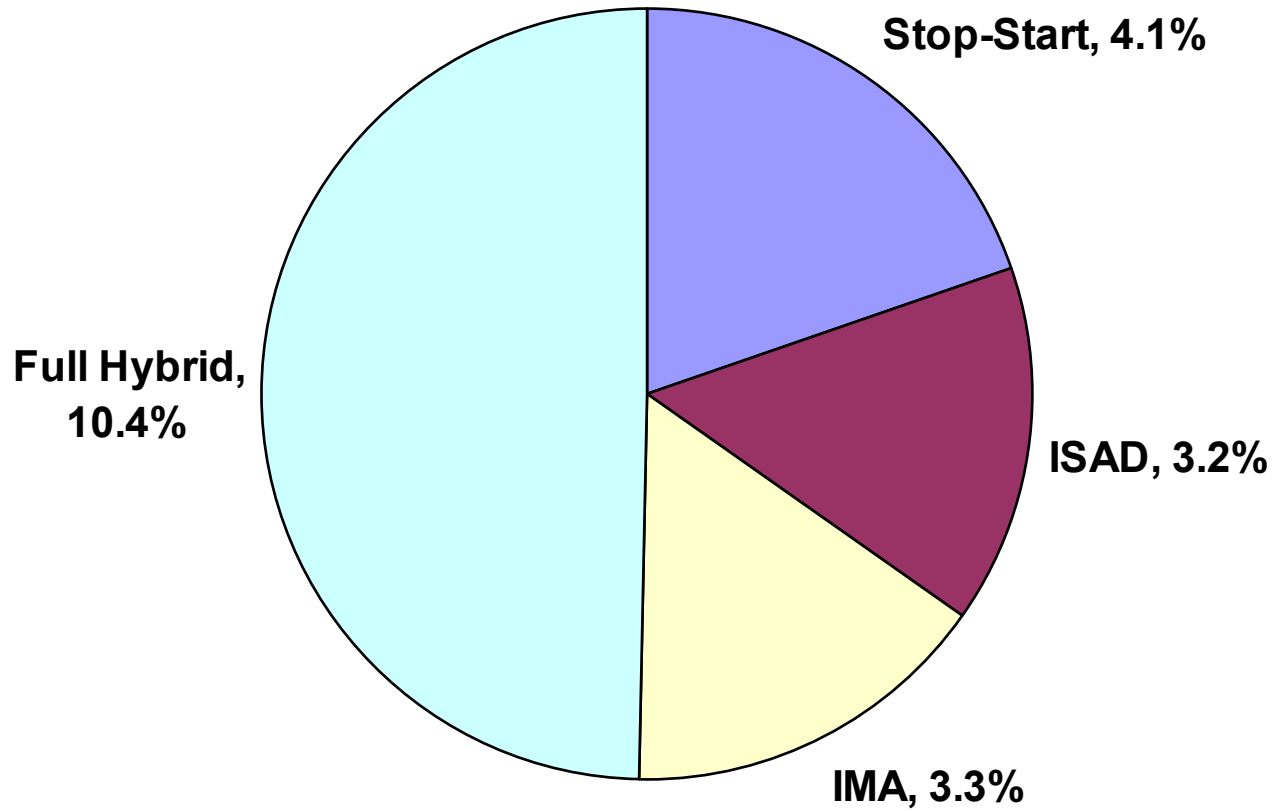


Technology Market Shares by Vehicle Type

2012 Best Guess Scenario



Hybrid Vehicles by Degree of Hybridization:
2012 "Best Guess Scenario"
(Total Hybrid Market Share = 21%)



Outlook:

Hybrid Share of New Vehicle Sales

- 2012: 5% to 20% of LDV market
- 2020: 10% to 25% of LDV market